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INSECT, PLANT DISEASE, & WEED SCIENCE NEWS [No. 91-20] [Aug. 16, 1991]

Alex Martin
University of Nebraska - Lincoln, amartin2@unl.edu

Bob N. Stougarrd
Extension Weed Specialist, University of Nebraska-Lincoln

Lisa Brown Jasa
University of Nebraska-Lincoln, ljasa@unlnotes.unl.edu

Insect Science Plant Disease Weed Science NEWS

UNIVERSITY OF NEBRASKA COOPERATIVE EXTENSION • INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES

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In this issue

ENVIRONMENTAL POLICY

Nebraska enforcement program lags; restricted use pesticides may be limited

This is the first article in a four-part series on agrichemical regulation in Nebraska.

The Environmental Protection Agency regulates the sale and use of pesticides in the United States under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Any pesticide sold in the United States must be registered with the EPA. Before granting approval of a new product, the EPA considers potential environmental impacts and establishes label restrictions on how the pesticide may be used. The EPA also is responsible for training and certifying applicators of restricted use pesticides. Finally, EPA monitors pesticide use to insure they are being used according to label directions and prosecutes pesticide misuse.

While EPA retains responsibility for federal pesticide registration, it delegates administration of the FIFRA user certification and enforcement program to states. Nebraska is the only state not to administer FIFRA for EPA. Because the Nebraska Legislature has not established a program to

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Regulating agrichemicals *(Continued from page 111)*

administer the FIFRA user certification and enforcement program may soon lead to restricted use pesticides not being available for use in Nebraska, as the EPA implements its proposed Pesticides in Ground Water Strategy.

EPA's original pesticide regulatory philosophy sought to prevent harm to applicators applying toxic pesticides, but it is now revising FIFRA regulations to include ground water protection. In its 1988 Pesticides in Ground Water Strategy, EPA proposes to require states to restrict or prohibit the use of pesticides most likely to contaminate ground water. EPA proposes to ban the use of those restricted use pesticides with the greatest ground water pollution potential (including general use pesticides such as atrazine which are being reclassified as restricted use pesticides) in states failing to implement the new EPA ground water protection policy.

In order to implement the EPA Pesticides Strategy, states must administer the FIFRA user certification and enforcement program, as well as the proposed pesticide use regulations. If EPA implements its Pesticides Strategy, some restricted use pesticides may not be available in Nebraska until the state (1) agrees to assume FIFRA administration and (2) adopts EPA pesticide use restrictions.

The next three articles in this series will examine issues associated with:

(1) current Nebraska agrichemical management programs;
(2) the EPA Pesticides Strategy, and
(3) choices for managing Nebraska's agrichemical policy.

J. David Aiken
Water and Agricultural Law Specialist

For more information

The following new or revised publications were recently released by University of Nebraska-Lincoln Communications and Computing Services.

EC91-883: Crop and Livestock Prices for Nebraska Producers. This report was compiled in response to numerous requests for historical price data for the major crops and livestock classes produced in Nebraska.

G75-249: 1990 Nebraska Farm Custom Rates — Part II. This NebGuide defines custom rates and reports common charges in 1990.

EC91-1773 Deer Damage Control in Nebraska. Has information on herd management, deer fencing, repellents, scare devices, and sources of supply.

CC361: The Food, Agriculture, Conservation, and Trade Act of 1990: An Overview; Part III — Miscellaneous Provisions. The intent of this publication is to outline the basic legislation, not the operating rules and regulations that will be announced separately for 1991 and subsequent years by the Secretary of Agriculture.

G91-1042 Mung Bean Production. This NebGuide discusses mung bean production including site preparation, variety selection, fertilization, weed control, insects and diseases, harvesting, and marketing of the crop.

G91-1046 Conservation Tillage and Planting Systems: Tillage system descriptions and comparisons.

EC91-734 Noise ... Sound Without Value. Includes historical list of noise levels for tractors, discusses effects of noise, hearing loss, sound measurement, and how to control noise.

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Lisa Brown Jasa, Editor

For more information about a particular subject, write the authors at the addresses below:

UNL Department of Entomology
202 Plant Industry Bldg.
Lincoln, NE 68583-0816

UNL Department of Plant Pathology
406 Plant Science Bldg.
Lincoln, NE 68583-0722

UNL Weed Science
Department of Agronomy
279 Plant Science Bldg.
Lincoln, NE 68583-0915

PLANT DISEASE

Is this just the tip of the iceberg?

Complex disease threatens corn

In southcentral Nebraska and northcentral Kansas, corn producers are warily watching the year to year development and spread of corn lethal necrosis, a devastating virus disease which poses a serious economic threat. This disease is caused by a mixed infection of maize chlorotic mottle virus (MCMV) and maize dwarf mosaic virus (MDMV). One of the two viruses, MCMV, overwinters in previously infected fields, while MDMV has to be reintroduced through its aphid vectors each year.

The MCMV virus alone can cause 10-15% yield loss in tolerant hybrids and 20-25% yield loss in susceptible hybrids. When the two viruses are found together, however, damage can climb to 75-80% in susceptible hybrids. Surveys in 1989 and 1990 indicated 1.3 million acres of corn potentially are at risk. The survey showed that 10% of the fields were infected with MCMV. Conservative annual loss estimates from MCMV alone are more than $3 million.

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In brief: Corn lethal necrosis

—Effects can be devastating, destroying as much as 80% of the crop in susceptible hybrids.

—First identified in Nebraska in Harlan County in 1977; slowly spread to 10 counties in southcentral Nebraska. Specific areas of new infection are Riverton-Inavale, Hildreth-Wilcox, and Bertrand-Smithfield-Elwood in Nebraska; continuing hot spots in Kansas are Republic, Phillips and Norton counties.

—Recommended control measures based on research data are crop rotation in combination with the planting of tolerant hybrids.

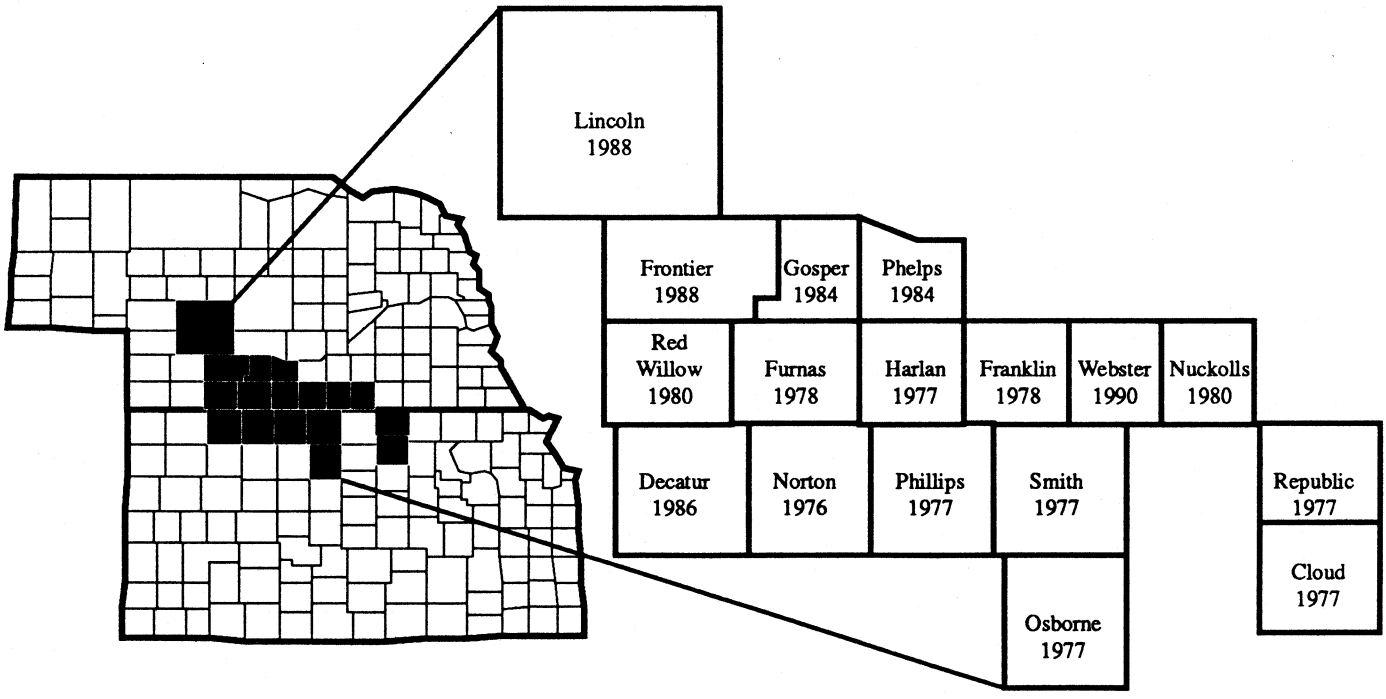

Figure 1. The spread of corn lethal necrosis in Nebraska and Kansas since it was first diagnosed in 1976.

Corn lethal necrosis *(continued)*

While losses have only been reported in 10 counties in Nebraska and seven counties in Kansas (see map), maize chlorotic mottle virus (MCMV) could spread into and eventually become established throughout the northern U.S. Corn Belt.

The disease represents a puzzling challenge for UNL plant pathologists, entomologists, and plant breeders who have been studying its development and effects since it was first reported in Harlan County in 1977. During the next 10 years, it slowly spread into six more counties with outbreaks and severe losses occurring in 1978, 1980, 1982, and 1984. During that time, I coordinated a multilocation evaluation of dent corn, popcorn, and sweet corn hybrids and inbred lines for their reaction to corn lethal necrosis. Hundreds of entries were evaluated, resulting in the identification of tolerant corn hybrids. Several inbred lines of dent corn also were identified and are being used in public and private breeding programs.

The impact of corn lethal necrosis was underscored in 1988 in southcentral Nebraska when a severe outbreak occurred in a nine-county area with losses estimated at more than $10 million. Following the outbreak, a major breeding program to improve genetic tolerance was initiated by the UNL Agronomy Department with input from the Nebraska Corn Breeders Association and the UNL Plant Pathology Department. This unique breeding project has already released five S_2 lines from two populations with improved levels of tolerance to CLN this year. Developing new hybrids, however, is a slow process, requiring 8-10 years.

Researchers were able to learn more about this disease in 1990 when an outbreak was reported in winter seed corn nurseries on the Hawaiian island of Kauai. In this case MCMV was found to be transmitted by thrips (*Frankliniella williamsi)* and in seed. Prior to this, beetles were the only known vector. In 1989 outbreaks were reported in winter seed corn nurseries in Mexico with incidents of the disease now being reported in five states, Veracruz, Mexico, Queretaro, Guanajuato and Michoacan.

Research is continuing to determine the overwintering mechanism of the MCMV, considered to be essential to finding a control method. Plots were established in 1990 to evaluate the effect of fumigation and crop rotation on the incidence of maize chlorotic mottle virus in a naturally infected field. Current research indicates that the disease can be controlled by crop rotation and the use of resistant hybrids. Fumigation reduced MCMV by 50% and increased yields by 24 bushels per acre. Soybean rotation was much more effective in reducing MCMV in first year corn (down to less than 5%) with a yield increase of nearly 60 bushels per acre. Crop rotation was found to be very effective in reducing the disease in first year corn following soybeans and was effective with grain sorghum or alfalfa.

Ben Doupnik

Hybrid plot tour planned for corn lethal necrosis

Corn producers and crop consultants can examine 79 hybrids in a corn lethal necrosis hybrid evaluation plot in Harlan County at a twilight meeting Aug. 26. Harlan County Cooperative Extension and the University of Nebraska South Central Research and Extension Center will host the meeting from 6 to 8 p.m. at the plot site 1.6 miles west of Orleans on Highway 89 at the Bose Farm.

Primary emphasis will be on hybrid evaluations for corn lethal necrosis and virus symptoms associated with the disease. The meeting is open to the public and should be of interest to corn growers, crop consultants and seedsmen. Corn lethal necrosis has been confirmed this year in Harlan County and Phillips County, Kan.

Ben Doupnik

Physiogenic leaf scorch linked to weather factors

During the last few weeks I've made a number of diagnostic responses termed "physiogenic leaf scorch" on a wide variety of agronomic field and horticultural crops, trees, or ornamental plants. What is "physiogenic leaf scorch" and what are its causes?

Symptoms appear as light or dark brown, necrotic areas along leaf margins that extend between the veins toward the mid rib, or as scattered spots over the leaf blades between the heavier veins. Usually, most or all of the exposed leaves are affected fairly uniformly. The condition results when plant roots are unable to supply enough water to replace that lost from the leaves.

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Tilt effectively controls leaf rust in irrigated wheat trial at North Platte

The fungicide Tilt was found to be an effective control of leaf rust in irrigated wheat in a trial at the Intensive Managed Wheat Plot at the West Central Research and Extension Center near North Platte. Tilt is manufactured by the Ciba Geigy Corporation.

Six hard red winter wheat cultivars showing a range in resistance to leaf rust were planted September 18, 1990. The residual soil nitrate was over 150 pounds of nitrate in 6 feet so the plots received no additional nitrogen fertilizer. The phosphorus level also was high. The trial was irrigated twice in the spring of 1991. Tilt was applied May 13, and plots were harvested July 11.

Leaf rust severity was less when Tilt was applied on all cultivars except for Sierra. The greatest reduction in leaf rust severity occurred with TAM 107, followed by Abilene. Leaf rust severity with the other cultivars was not high enough to significantly affect yield and test weight. The Tilt-treated TAM 107 had a 19-bushel yield advantage and a 3-pound test weight advantage over the untreated TAM 107. These data show the importance of fungicide application in protecting yield and test weight on leaf rust susceptible wheat cultivars. 1991 was a good year for leaf rust.

John Watkins and Gary Hergert

Cultivar	*Tilt*[1]	*Yield (bu/A)*	*Test Wt (lb/bu)*	*Leaf Rust (%)*[2]
Abilene	-	52	62	31
Abilene	+	60	63	8
Karl	-	60	61	16
Karl	+	61	61	6
Redland	-	55	55	16
Redland	+	56	55	6
Sierra	-	61	61	3
Sierra	+	65	60	5
TAM 107	-	40	59	69
TAM 107	+	59	62	31
TAM 200	-	52	62	17
TAM 200	+	60	64	4

[1] - means no Tilt applied, + means Tilt was applied.
[2] Leaf rust rated as percent severity on the flag leaf on June 12.

Phytophthora root/stem rot diagnosed in soybeans

Soybean plants showing the typical symptoms of Phytophthora root and stem rot are being observed in fields now. Diseased plants turn yellow, wilt, wither and die prematurely, leaving short-to-long gaps in the row. Typical symptoms include wilted plants with scorched, yellow leaves. Such plants also will exhibit a distinct browning on the outside of the stem extending from below the soil line upward to include portions of one or more branches. Dug plants will reveal tap roots that are dark brown, and entire root systems may be rotted and/or lacking a normal fibrous root mass.

The disease is caused by a soil-borne fungus in association with previously-infected soybean residue. The infection process is favored during wet weather on poorly drained or compacted sites, however infection is not limited to these soil/weather conditions.

Control is principally through avoidance. Crop rotation will reduce disease severity in future soybean crops, but will not eliminate the fungus from the soil. The best safeguards against significant yield losses are:

- growing multiple race resistant or tolerant varieties on well-drained sites;
- using high quality, certified seed that has been treated with Apron®;
- making a band or seed furrow application of Ridomil® at planting time; and
- crop rotation.

David Wysong

Physiogenic leaf scorch *(Continued)*

This condition can occur when the plant's water-conducting elements are dysfunctional due to root or stem diseases or because of insect activity, but it is more likely related to evapo-transpiration potentials (E-T POT). According to ag climatologists, a high E-T POT exists when four weather factors connect: intense solar radiation (bright sunlight), high temperatures, low relative humidity, and strong, hot winds. Contributing factors would include no precipitation during this period and possibly reduced soil moisture.

When trying to identify this condition, consider recent weather patterns, the suddenness of symptom expression, and general distribution of the malady on the leaf blades. A laboratory examination may be necessary to eliminate possible pathogenic factors.

David Wysong

INSECT SCIENCE

Mites, 2nd generation corn borers active

The second generation of ***European corn borers*** are difficult to manage because of the extended period of egg-laying (often more than three weeks). No one insecticide application effectively controls all the corn borers that hatch from these eggs. Nebraska data shows that it is rarely economical to treat more than once in field corn for second generation corn borers. Our management recommendations focus on controlling the first hatching borers because these cause more direct yield loss. The yield loss per borer decreases rapidly after the blister stage, and insecticides applied for corn borers after this stage rarely yields a profit. However, these later hatching borers may survive to bore in the stalks and ear shank, weakening the plants and leading to stalk breakage and ear drop later in the season. This can decrease harvestable corn. Fields severely damaged by second generation corn borers, with evidence of stalk breakage or ear drop, should be harvested first to prevent any additional loss of harvestable yield.

Spider mites are in many corn fields and producers should scout carefully to determine the need for treatment. Spider mite identification is important since the two spider mites common in Nebraska corn, the Banks grass mite and the twospotted spider mite, differ greatly in insecticide susceptibility (see *IPW News,* 91-17, pages 95-96). Spider mite control rarely is profitable when corn has reached the dent stage.

Bob Wright